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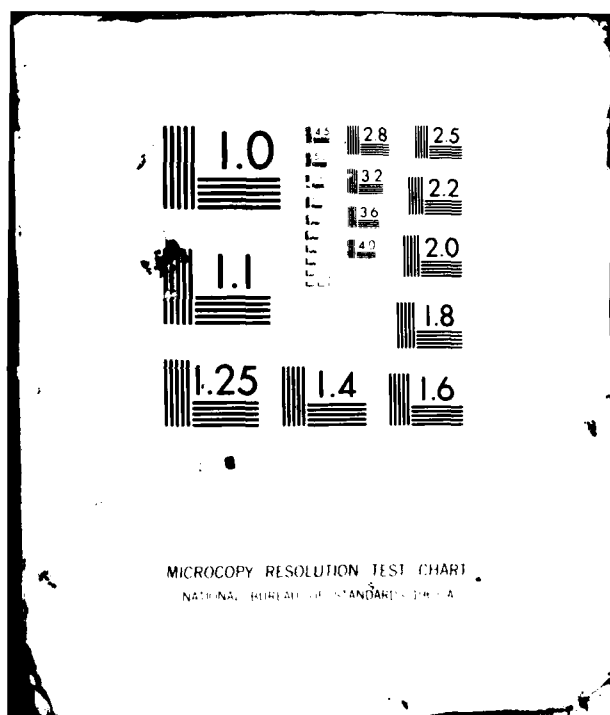
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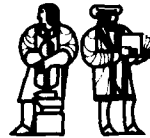


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PCAL: A PERSONAL CALENDAR

Irene Greif

January 1982

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PCAL: A Personal Calendar

Irene Greif

December 29, 1981

Abstract

This paper is a user's guide to PCAL, the personal calendar program available on the MIT-LCS DEC-20/60. The program can be used to create and maintain a personal database of calendar information including appointments, meetings, classes (and other regularly occurring meetings) and notes.



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1. Introduction

PCAL, the personal calendar program, supports a single user in maintaining a record of his appointments. The program is currently available for use on the MIT Laboratory for Computer Science DEC-20/60 (MIT-XX on the ARPANET). This paper is a description of the program: section 2 is an overview of PCAL's functionality and of the user interface; section 3 is a guide to using the PCAL; and section 4 contains details of each command.

PCAL has been designed and implemented as part of a research project on support tools for multi-person informational work [Greif and Hammer 1980a]. Calendar management is an example of an office activity that involves cooperation and information sharing among groups of co-workers. Ideally a calendar program should support communication protocols for calendar sharing, for negotiating times for meetings, and for informing people of changes to their schedules. [Greif, 1980b].

Appendix I contains a list of planned extensions to PCAL. A number of these extensions will provide support for meeting scheduling and calendar sharing. Design notes will be published for individual items on the list and new releases of PCAL will be announced as we add requested functions. Suggestions for additions to this list are welcome.

2. Overview of PCAL

2.1 Functionality of PCAL

PCAL can be used to make, cancel and change appointments. A brief appointment description (the "keywords") can be entered at a date and time. The appointment record may also include an end time, comments and a list of participants. Any of this information can be changed, and the calendar will be updated accordingly. Repeating appointments such as classes can be added as "series" of appointments to the calendar.

A note can be associated with a date, but not at a specific time. The date or the text (keywords) of a note can be changed, a note can be erased, and as with appointments, one can specify a series of daily or weekly notes.

These appointments and notes are stored in a personal calendar database (referred to hereafter as the calendar). One other kind of record can be stored in the calendar: a seminar. It is like an appointment in that it has a date and time, but it also contains seminar information such as speaker and host names.

Notes and appointments (and seminars) are retrieved from the calendar by date or date and time. They can be displayed in any of three ways:

- keywords for all appointments (and notes) for a day are displayed. Appointments between 9am and 5pm appear in a tabular form showing blocks of free and occupied time. [cf. Figures 1-3, 6, 7]
- keywords for all appointments for a day (or week) are listed in time order [cf. Figure 5].
- a single appointment is written out in full detail including comments and participant list [cf. Figure 4]

It is possible to look at other people's calendars, although the current version of PCAL does not allow one to write in anyone else's calendar. There is one exception: a user who is designated as "secretary" for another person's calendar can write in that calendar.

A calendar can contain more than one appointment at a single date and time. When a new appointment conflicts with an old one, the user is notified, but the new appointment is still entered. It can be rescheduled by changing its date and/or time. Alternatively, the undo command can be used to remove it from the calendar.

2.2 The User Interface -- Screen Layout

The screen is divided into sections (windows) that are used to display different kinds of information:

- The top two lines of the screen are used to show *status* information including the calendar name and current operation. Also, a "current" day and "past" day are shown. The current day is the day that was affected by the last PCAL command that was executed. It will be used as the default date in commands until a new date is specified.¹
- The *main* section of the display contains calendar information such as lists of appointments.
- The bottom line of the screen is the *command line*. The normal prompt in the command line is **pcal>**. Users type commands and their arguments in this window. A small text editor is available in this window so that it is possible to modify a command line once it is written and before it is executed.
- The line above the command line is the *message line* used to display short error messages and other information about PCAL operations.
- There is a *help window* that appears, overlapping the side of the main display whenever the user requests help. This same window is sometimes used for presenting information about the last PCAL operation.
- At the user's option, command arguments can be entered by filling in a form. The form appropriate to the current command will appear at the bottom of the main window in the *forms window*.

Some sample screen layouts appear in the figures at the end of the paper. At start-up the display will be as in Figure 1. That is, the appointments for "today" will be displayed in the main window, the status window will have been initialized, and some information about the current version will appear in the help window. The help window can be erased at any time by typing <control L>. This redisplay capability can also be useful when system generated messages interfere with PCAL's display.

There are some relationships between the data shown in various windows. For example, once the date entry of a form is filled in, the main display is changed to show the appointments for that day [cf. Figure 7].

Occasionally information to be displayed in the main window or the help window will not all fit on the screen at once. In this case, a special line at the bottom of the window will be used for "scrolling" commands. Type "+N" (control N) to see the next screenful, type "+P" to see the previous screenful, and type carriage return to resume ordinary calendar operations.

¹ Whenever the current day is changed, the last current day is remembered as the past day since it is likely to be a date that the user will want to refer to again easily. PCAL will recognize "CURRENT" and "PAST" as names of days, just as it recognizes "MONDAY," "TUESDAY," etc.

3. How to Use PCAL

3.1 Starting PCAL

To start the calendar program, type:

@PCAL *calendarname*

Calendarname may be blank, in which case PCAL will expect the calendar to be in the caller's login directory in a file called "name_pcal.cal_db," where the "name" part is the last word of the caller's login name. (If the caller's login name is of the form xx.yy.zz the "name" will be zz.) If there is no such file, PCAL will create one.

Alternatively, *calendarname* may be in one of the following forms:

- a-user-name -- PCAL will look for the calendar in the file <a-user-name>name_pcal.cal_db, where the "name" part is determined as above.
- <a-directory-name>a-calendar-name -- If a directory name and calendar name are given, then PCAL will try to find a calendar in the file <a-directory-name>a-calendar-name_pcal.cal_db. If only one of the two names is given, PCAL will prompt for the other.

If PCAL cannot find the specified calendar AND the directory name of the calendar file is the name of the caller's own directory, PCAL will create a new calendar.

A calendar consists of *three* files with second names "cal_db," "init" and "lock." The first is the actual database. The second contains information about the authorized users of the calendar.² The third is used as a lock for coordinating multiple users of the calendar. These files are updated to reflect calendar changes after each PCAL operation. Thus the user need not explicitly "write" changes to disk as he would, for example, in most text editors.

In the current version of PCAL one cannot create a calendar in another person's directory. It is possible to read a calendar in another directory. Read access is determined by the operating system according to the protection settings of the directories and files. Write access is allowed only to people who both have access according to the protection settings and are listed in the calendar's "init" file [cf. Section 3.5].

²This file also contains additional information that currently is not used by PCAL.

3.2 Help Facilities

3.2.1 Reading Help

The commands can be listed by typing a carriage return (after an empty line) in response to the **pcal>** prompt. "Help" or "?" in the command window will produce a short help message. For more detailed help, type "help help." For help that is specific to a command type "help <command name>" or the command name followed immediately by a "?". Many command names are several words in length: a command name followed by a space and a "?" lists the possible next words. (If there are no "next words" then the help message will explain the meaning of the command as typed.)

3.2.2 Long Help

When a help message will not fit on the screen, a special line at the bottom of the help window will be used for "scrolling" commands. Type "↑N" (control N) to see the next screenful, type "↑P" to see the previous screenful, and type carriage return to resume ordinary calendar operations.

3.2.3 Forms Help

When arguments are not supplied with the command on the command line, a form will appear in the lower part of the main display [cf. Figure 6]. Arguments can then be specified by filling in this form.

There are two kinds of help available for filling in forms. To find out what kind of information to type into an entry, type "?" in that entry [cf. Figure 6]. The help message will explain:

- what kind of information to enter: e.g. a date,
- what interpretation PCAL will place on this information: e.g. a time might be a start of an appointment or an end of an appointment, or even a length of an appointment,
- whether the information is required or optional: generally dates and start times are required, end times, comments and participant lists are optional.

The second kind of help is about the "forms editor." Type ↑H (backspace) to read help on how to use this forms editor. It explains the use of the "arrow keys" (or their corresponding escape sequences) to move around from entry to entry or to exit from the form. This help message will also list the editing commands that can be used within each entry of the form: this editor is somewhat like a miniature TED or EMACS based on control-character editing commands.

3.3 The Command Language

3.3.1 The Command Line

Commands are in the form of short phrases such as "schedule appointment" or "cancel 1-1 noon". It is not necessary to type the whole command name, a prefix will do. However, if the characters don't identify a single command, a list of the possibilities will appear [cf. Figure 3].

Information (arguments) can be given to most commands on the command line. If all of the necessary information is provided the operation will be performed. If some additional information is required, then a form will appear with blanks for the rest of the information. If part of a command line cannot be understood it will be ignored and a form will be displayed. While typing on the command line, one can use the same editing commands that are available for editing entries in forms [cf. Section 3.3.2].

The easiest way to learn about PCAL is to type commands with no arguments -- the appropriate form will appear, prompting for the necessary information.

3.3.2 Filling in Forms

The forward and back arrow³ keys can be used to move from entry to entry in the form. Up arrow "enters" the form -- the form will be processed by PCAL. Down arrow "quits" from the form -- the form will disappear and the current command will be aborted.

Within an entry some simple editing commands can be used for deletion of characters or whole entries. The editing commands are listed in Appendix IV. This list can be obtained in PCAL by typing ↑H (backspace). To find out what kind of information is expected in an entry of a form, type a "?" in that entry.

Note that when in a form, carriage return is usually equivalent to forward arrow -- it causes a move to the next entry if there is one. However, some entries can have several lines in them: examples are the comment entry and the participants entry of an appointment form. In these cases carriage return has the ordinary function of going to the next line in the entry. An arrow key must be used to leave the entry.

³The escape sequence equivalents of these arrow keys can be used as well. The escape sequences are listed in Appendix IV.

3.3.3 Short Command Lines

There are a number of short cuts for typing in appointments and notes without typing a command name. The experienced user may choose to make appointments, add notes and show new days using these abbreviations, rather than filling in forms. PCAL will make the following assumptions about the intended commands:

- Typing a date will change the current day and display that day's appointments.
- Typing a date, start time, end time (optional) and keywords will cause an appointment to be made at the specified date and time. If no date is given, the current date is used as a default. Thus one can enter a new appointment on the current day by typing only a time and keyword.
- Typing a date and keywords (but no times) will result in adding a note to the list of notes for that date.

The default command if none can be recognized is "schedule." Thus a new meeting can be created by typing "meeting" rather than "schedule meeting."

3.4 Format of Time and Date Information

3.4.1 Time

Times can be written in the form HH:MM using 12-hour time, followed by AM and PM. Only an "A" or a "P" need be typed. Times without a sufficient number of characters for the form HH:MM in them will be padded with zeros as follows:

```
12:2    => 12:02
12      => 12:00
```

DEFAULTS: When AM or PM is not specified times from 7 through 11:59 are interpreted as AM, times from 12:01 through 6:59 are PM. (12:00 or 12:00PM is noon, 12:00AM is 0:00, printing as MIDNIGHT. PCAL will recognize the word NOON as a time).

PCAL will interpret times between 12:01 and 23:59 according to a 24 hour clock. The time 24:00 is not acceptable.

3.4.2 Dates

In commands that require a date, the default is the "current day" shown at the top of the screen. The current day is set to the actual date ("today") when PCAL is entered, and is changed in accordance with the dates of the appointments, meetings, etc. that are made or cancelled.

Dates are entered in one of the following forms:

- <month>-<day>-<year>: the month must be written as a number, 1 through 12, not as a name (such as "January"); the year can be "19yy" or simply "yy".
- <month>-<day>: When no year is specified, the year will be set so that the specified day is in the *future* (with respect to today's date). Thus, if today is 2-1-1981, the date 2-3 will be understood to be 2-3-1981, whereas 1-31 will be understood as 1-31-1982.⁴
- One of the words "TODAY," "YESTERDAY," "TOMORROW."
- A name of one of the days of the week: "MONDAY", "TUESDAY" etc. (these are interpreted with respect to the "current" day)
- "NEXT" or "PREVIOUS," which are the days after and before the current day, respectively. ("CURRENT" is also a legitimate date. It is rarely necessary to explicitly write the date "CURRENT" since leaving the date unspecified will have the same effect.)
- "PAST" is the day that was current before the last calendar operation. This date is also displayed at the top of the screen.

NOTE: The user may not always intend <month>-<day> to be in the future and may find the results to be surprising. An intended addition to PCAL will allow the user to write a "user profile" that can include, among other things, his preferred interpretation for dates.

3.5 Roles and Access Rights

A calendar can be accessed by people according to their assigned roles. In the current version a user may be an OWNER, SECRETARY or other (not listed). The OWNER has full access, including the ability to read or write in the calendar and to change access rights. The SECRETARY can do everything except assign access rights. No other users can modify the calendar. Other users can read the calendar only if they have access according to the system directory or file protection settings.

NOTE: While PCAL will enforce these access rights, it can provide no protection against deletion or modification of the file through TOPS-20 Exec level commands by users who have access to the file. If a calendar contains important, sensitive information, it may be advisable to reset its protection after it is created by PCAL. System protection can override PCAL protection so that not even the designated secretary can modify the calendar without first obtaining access to the files.

⁴There is one exception to this convention. The ARCHIVE command [cf. Section 4.2.1 below] works only on dates in the past. Arguments to this command that do not specify a year will be assumed to be in the past.

4. Descriptions of the Commands

4.1 Commands for Adding Items to a Calendar

4.1.1 NOTE

NOTE is used to add a note to a day. A date and some keywords (the note) are both required.

The date and the note can be typed on the command line. The default date is the current date, so that, e.g. "note call joe" is the same as "note current call joe."

NOTE SERIES will prompt for two dates -- a start date and an end date -- as well as a frequency (daily or weekly). The note will then be entered daily or weekly between those two dates. "NOTE <date1> <date2> <anote>" is a short form for a daily series of notes.

It is also possible to enter a note by simply typing a date and the note on the command line without typing the word NOTE.

4.1.2 SCHEDULE

SCHEDULE is used to add items associated with a date and time to the calendar. It is actually four commands: SCHEDULE APPOINTMENT, SCHEDULE MEETING, SCHEDULE SEMINAR, and SCHEDULE SERIES.

- SCHEDULE APPOINTMENT is used to enter a new appointment in the calendar. An appointment has a date, a start time; an (optional) end time and some short keywords that appear on the calendar display. An optional list of participants and a longer comments part can also be entered. They are displayed with the "show form" command. The form for an appointment has entries for date, start time, end time, keywords, comments and participants. Conflicts are reported to the user, but the conflicting appointment will be added to the calendar regardless. (CANCEL, UNDO, or CHANGE can be used to eliminate the conflict). Conflicts with the calendars of other participants can be checked with the CHECK PARTICIPANTS. This will not be done automatically.
- SCHEDULE MEETING is synonymous with SCHEDULE APPOINTMENT.
- SCHEDULE SEMINAR sets up a seminar which is similar to an appointment but includes information about speaker, subject host and phone number, and refreshment time. A form is always used, even if date, time and keywords are given on the command line.
- SCHEDULE SERIES will schedule appointments at a number of times according to a frequency (daily or weekly), start date, end date, start time and (optional) end time. Changes to individual appointments can be made using CHANGE. The keywords given to the series are part of the

keyword for each individual appointments. Additional keywords for individual appointments can be entered using CHANGE [cf. the 1 pm appointment in Figure 1]. (A series of appointments can be canceled using CANCEL SERIES.)

For all but SCHEDULE SERIES, it is possible to write information on the command line rather than into a form. The date, times and keywords can be typed immediately after the command name. The end time is optional. If only a time and keywords are given, the current day will be taken as default.

It is also possible to make an appointment by simply typing the date, time[s] and keywords without typing SCHEDULE APPOINTMENT.

4.2 Commands for Examining the Calendar

4.2.1 LIST

LIST lists the appointments and notes of on a specified day (LIST DAY) or week (LIST WEEK) [cf. Figure 5]. Each requires a date argument. LIST DAY lists the appointments and notes on the given day. LIST WEEK lists the appointments and notes for the week beginning on the given day.

4.2.2 LOOK AT

LOOK AT reads another calendar. The name of the calendar must be specified either as a user name or as a directory-name, calendar-name pair (written <directory-name>calendar-name). If the directory name or calendar name (or both) is missing, PCAL will prompt for the required information. The status window will display *READ-ONLY* after the calendar name if the user is not authorized to change the calendar. The status will also display *READ-ONLY* if the user is authorized but some other authorized user has the same calendar "locked." In this case the other user's name will be reported.

LOOK AT can be used to create new calendars in the users login directory.

4.2.3 PRINT

PRINT DAY writes out the day's appointments and notes into a file named <calendar-name>.<date> in the user's login directory. PRINT WEEK writes out the week's appointments and notes. The format of the list is identical to that of the display for the LIST command.

4.2.4 SHOW

SHOW changes the main display. There are three SHOW commands: SHOW DAY, SHOW FORM and SHOW USERS.

- SHOW DAY results in the following display of a days appointments and notes: The notes appear at the top of the main window, and the appointments appear below it. The day is broken up into 30-minute sections from 9am to 5pm. If an appointment lasts more than half an hour, appropriate time slots will be XX'ed out. Appointments before 9 and after 5 are listed on single "morning" and "evening" lines, respectively.
- SHOW FORM shows details of a seminar, appointment, or meeting. This includes the comments and participants fields which are not normally displayed when appointments for a day are listed.
- SHOW USERS displays a list of the authorized users of the calendar. Currently, the only other authorized users are the owner and possibly a secretary [cf. SET SECRETARY, section 4.4.6].

4.3 Commands for Removing Items from the Calendar

4.3.1 ARCHIVE

ARCHIVE can be used to remove appointments from the calendar. The appointments will be recorded as text in a file named "name_pcal.cal_archive," in the directory of the calendar that is currently being LOOKed AT. If an archive file already exists, the appointments will be added to the existing list in that file so that a continuing record of past appointments can be kept in one file. The archive file can be read as a text file if one needs to examine past appointments. The appointments cannot be read back into the calendar from the archive file. [Cf. footnote to section 4.4.7 for explanation of UNDOing an archive operation.]

ARCHIVE requires a start date and end date, and then removes appointments from the calendar for all days between these two dates. The dates must both be in the past. (In fact, the default year for archiving dates will be in the past, an exception to the conventions described in Section 3.4.2)

Archiving appointments will make all calendar operations more efficient. Ideally archiving should be done automatically at intervals specified in a user profile [cf. Appendix 1]. In the current implementation, the ARCHIVE operation should be used periodically to remove past appointments from the calendar.

4.3.2 CANCEL

CANCEL will cancel an appointment at a given day and time. If there is more than one appointment at the given date and time, a numbered list of appointments will appear in the "help" window. The user can select one appointment, by number, or all appointments, by typing "all."

CANCEL SERIES will cancel a series of daily or weekly appointments. The date and time used to identify the series should be the date and time of any appointment in the series.

4.3.3 CLEAR

CLEAR AM will cancel all appointments from the morning (9am to noon) of the given day.

CLEAR PM will cancel all appointments from the afternoon (noon to 5pm) of the given day.

CLEAR DAY cancels all appointments and erases all notes on the given day. The default is the current day.

CLEAR alone will be taken to mean CLEAR DAY.

4.3.4 ERASE

ERASE NOTES can be used to remove notes from the calendar. If there is more than one note on the given day it will be necessary to select one (or all) for deletion. This is accomplished as described above for CANCEL -- a numbered list will appear in the "help" window.

ERASE SERIES will cancel a series of daily or weekly notes. The date used to identify the series should be the date of some note in the series.

4.4 Other Commands

4.4.1 CHANGE

CHANGE can be used to modify appointments in the calendar. CHANGE NOTE is for changing notes. As in CANCEL or ERASE, it is necessary to select the appointment or note. This can be done on the command line or via a form. For CHANGE NOTE only a date on the command line can be specified -- ambiguities will be resolved if necessary by selection of a single appointment from a list. To CHANGE an appointment a date and time can be given on the command line. The alternative is to fill in a form with two fields: date and time.

Once an item is selected, a form will appear with entries containing the current information for the item. Changes can be made to any field using the forms editor. When finished type "up arrow," to install changes or "down arrow," to quit without making the changes.

Individual appointments in a series can be changed using CHANGE, but the keywords associated with the series as a whole cannot be changed.

NOTE: Two different forms are used in this command. One is used to specify the appointment. The other is used to modify the appointment.

4.4.2 CHECK

CHECK is used to perform various kinds of checking on an appointment. Currently the only kind supported is CHECK PARTICIPANTS, which checks for conflicts in the calendars of the participants of a given meeting. The meeting must be specified by date and time. If there is more than one meeting at the specified time it will be necessary to select one for checking. This is accomplished as described above for CANCEL -- a numbered list will appear in the "help" window.

If there are any conflicts, a list of alternative times (on the same day only) is provided. If any participant name does not correspond to an existing calendar or if a calendar is not available for reading, this information is also reported. The CHANGE command can be used to select an alternative time and/or modify the set of participants according to this report, e.g., by correcting the spelling of a user name or by rescheduling the meeting to avoid conflicts.

This command runs slowly because it reads each participant's calendar from disk. For now, this command does NOT write into the other participants' calendars -- it is the responsibility of the caller of a meeting to inform participants, via mail or any other means, about meetings.

4.4.3 ESCAPE

ESCAPE is only for debugging. It has no effect in this version of PCAL.

4.4.4 QUIT

QUIT exits to the Tops-20 Exec; the user can return to PCAL by typing "continue pcal" or just "pcal." Locks are released on exit; it may not be possible to get write access on return if someone else has taken the lock. When PCAL is continued, the calendar is reread (and the user informed) if the calendar has changed. Thus any changes by other users will be visible on continuation.

4.4.5 REDISPLAY

REDISPLAY clears the screen and redisplay all information except for error messages and help. It does not automatically update the list of appointments to reflect changes in the calendar. When the calendar being LOOKed AT is READ-ONLY another user may be changing the calendar. To see those changes it is necessary to LOOK AT the calendar again.

4.4.6 SET

SET SECRETARY can be used to set the name of the SECRETARY. The name must be a login name for a user of the system. This person will have full access to the calendar except for assigning access rights.

4.4.7 UNDO

UNDO can be used to undo the last operation. Some operations such as "look at," "set secretary," "archive"⁵ and all the display operations, cannot be undone in this way; the user will have to use the necessary operations to go back to the previous state.

⁵Archive can be partially undone using UNDO. The appointments that have been deleted from the calendar will be rewritten. However, the archive file will not be changed by UNDO and will still contain the list of appointments for the archived period.

5. REFERENCES

Greif, I. and M. Hammer. 1980a. Multi-Person Informational Work (Proposal to DARPA). MIT Office Automation Group Working Paper, WP-026. August 1980.

Greif, I. 1980b. Support Tools for Calendar Activities. MIT Office Automation Group Working Paper, WP-025. August 1980.

Appendix I -- Plans for Extensions

The following is an (unordered) list of features that we would like to add to PCAL. Some have been designed in detail already. Others are suggestions we have had from users. (NOTE: Many of them would be good undergraduate or master's level thesis topics).

- *Sharing calendars* -- Calendars are sometimes shared by e.g. a secretary and manager or by a working group. We are trying to define good defaults for some of these working relationships. At the same time we are working on developing a user language for defining working relations, access rights, etc. The result will be a considerably richer set of user roles than the currently implemented secretary/owner roles.
- *security (access control)*
 - * roles (e.g. secretary, manager)
 - * user definition of roles
 - * locking protocols
- *Holidays* -- A central database of common holidays will be available for optional inclusion in calendar display. This will relieve the calendar owner from having to enter holidays explicitly in his own private calendar database. The SCHEDULE commands will report conflicts with holidays as well as with other appointments. (This feature has been implemented by John Cimral).
- *Scheduling meetings on other people's calendars*
 - * To be added as soon as additional access rights are implemented
- *Sending out seminar announcements* automatically (using mm for people who don't have calendars)
- *Sign-up sheets* for conference rooms (201, 512, 516)
 - * automatic sign-up of requested room when making a meeting
 - * automatic generation of alternative room assignments
 - * notification of conflicts with other meetings in other rooms (useful for conflicts of outside speakers from different groups)
- *Real-time communication* -- Sunil Sarin has implemented a "real-time calendar" in which a group of people can be on-line at once in a "meeting to schedule a meeting." We would like to make this subsystem available in PCAL.
- *tickler files*
 - * there should be various kinds of notes: deadline, reminders, things to do.
 - * it should be easy to invoke the tickler part of PCAL. from a login.cmd to get notification at

login

- *user interface improvements*

- * make it usable on more terminal types, including printing terminals
- * make it easier to select items (by cursor movement, etc. rather than by writing out date and time)
- * reduce the number of top-level commands
- * modify parsing of dates and times to accept additional formats

- *database retrieval* -- subject of Bachelor's Thesis this term

- * by subject and participant
- * by time range
- * by "conflicts with"

- *notification*

- * new appointments (written by others)
- * pending business (unscheduled or unconfirmed meetings)

- *user profiles*

- * default display (block diagram or list)
- * 24-hour or 12-hour clock
- * European dates
- * default year
- * conflict reporting policy
- * number of transactions to remember for undo
- * prompting, use of defaults, use of forms
- * options for meeting form disposition -- whether to check other calendars or not, whether to notify participants, etc.
- * archiving

Please send additional suggestions or comments to the author. (Arpanet address: GREIF@MIT-XX.)

Appendix II -- Implementation Notes

PCAL is implemented in CLU and runs on the DEC 20/60 at MIT's Laboratory for Computer Science. The program contains about 2500 lines of code for calendar operations. In addition, it uses a window package written by Larry Rosenstein,⁶ a forms editor written by John Wenn⁷ and a command package written by Andy Tallian⁸.

The program currently can be run from the following terminals:

- vt52
- vt100
- Ann Arbor Ambassador
- Heath H19
- Teleray

PCAL has been in general use since September 1981. Over a hundred people have tried it to give us feedback and about twenty people now use it regularly.⁹ We keep a log of users and of unhandled exceptions for debugging purposes. We will probably be extending the logging facility to gather more information for human factors studies.

Several people at other sites are trying to use PCAL. Since CLU is not generally available on other machines we have simply transported the executable code to other DEC 20/60's. The only portability issue so far has been differences in terminal type numbering conventions on different machines.

⁶Larry Rosenstein. "How to Use the FCOLE Redisplay System." Internal Documentation, December, 1980.

⁷John Wenn. "A Forms Editor for an Office Calendar." Bachelor's Thesis, June 1981.

⁸As a UROP project following design by Sunil Sarin.

⁹We do not have records of usage on machines other than our own DEC-20/60, so there may be more regular users at other sites.

Appendix III -- List of Commands

The following is a list of the calendar commands. Arguments are written in brackets, e.g. <date>. Note that phrases consist of multi-word commands, e.g. "schedule appointment," followed by arguments. We don't indicate the arguments of the functions for adding new items to the calendar: they are implicit in the blank form filled out for a new item. See Section 4.1 for descriptions of command lines for these commands.

Some commands require an appointment as an argument. An appointment is specified by its date and time. If the appointment is on the currently displayed day, then only the time need be supplied. If there is more than one appointment at a given date and time, a numbered list of alternatives will appear in the help window -- the user identifies the appointment by number.

- For adding new items to the calendar:

- * note
 - note series
- * schedule (same as schedule appointment)
 - schedule appointment
 - schedule meeting
 - schedule seminar
 - schedule series

- For examining calendar entries:

- * list (same as list day)
 - list day <date>
 - list week <date>
- * look at <calendar name>
- * print (same as print day)
 - print day <date>
 - print week <date>
- * show (same as show day)
 - show day <date>

- show form <appointment specification>
- show users
- For removing items from the calendar:
 - * archive <start date> <end date>
 - * cancel <appointment specification>
 - cancel series <appointment specification>
 - * clear (same as clear day)
 - clear day <date>
 - clear am <date>
 - clear pm <date>
 - * erase (same as erase note)
 - erase note <date>
 - erase series <date>
- Other operations:
 - * change <appointment specification> (or <date>)
 - change note
 - * check
 - check participants <appointment specification>
 - * escape (for debugging only)
 - * help <command name>
 - help help
 - * quit
 - * redisplay
 - * set
 - set secretary
 - * undo

Appendix IV - Commands in the Forms Editor

Commands to move around in and leave a form:

- Back Arrow -- Go to the previous entry (Esc D)
- Forward Arrow -- Go to the next entry (Esc C)
- Up Arrow -- Process this form (Esc A)
- Down Arrow -- Don't process form -- "quit" (Esc B)

The editing commands are:

- ↑B Go back one character
- ↑F Go forward one character
- ↑P Go to the previous line
- ↑N Go to the next line
- ↑A Go to the start of the line
- ↑E Go to the end of the line
- ↑L Redisplay the screen
- ↑D Delete this character
- <delete> or <rubout> Delete previous character
- ↑K Erase this line
- ↑Q Insert the next character (inserting "?")
- ? Display help for this entry
- ↑H Display help for the forms editor

Appendix V - The PCAL Display

Figure 1

| | | | |
|---|---|---------------------------------------|--|
| PAST DAY: 3 November 1981 CURRENT DAY: 3 November 1981 | | CALENDAR: ps:<greif>GREIF COMMAND: | |
| TUESDAY 3 November 1981 | | | |
| 9:00 9:30 10:00 Design 10:30 xx 11:00 xx 11:30 xx NOON 12:30 1:00 course : first session 1:30 xx 2:00 Andy Tallian(at 2:15) 2:30 3:00 3:30 4:00 4:30 5:00 | <div style="border: 1px solid black; padding: 10px;"> <p style="text-align: center;">*** Personal Calendar ***</p> <p style="text-align: center;">Version 2.3</p> <p style="text-align: center;">October 29, 1981</p> <p>Type '?' for a short help message.</p> <p>Type carriage return to get a list of the commands.</p> <p>Changes in PCAL 2.3:</p> <p style="padding-left: 20px;">SCHEDULE MEETING and SCHEDULE APPOINTMENT now both have comments/participants.</p> <p style="padding-left: 20px;">new command: CHECK PARTICIPANTS, reads the calendars of meeting participants in order to check for conflicts</p> </div> | | |
| pcal> | | | |

Fig. 1: The calendar display for November 3, 1981¹⁰

¹⁰The 1pm appointment is part of a series. The series keyword is "course". The keyword for the November 3 instance of the course series is "first session".

Figure 2

| | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---------|---|---------|-------|--------|-------|------|-------|--------|------|------|---------|-----------|-------|------|------|----------|-----|--|------|--|
| PAST DAY: 15 February 1982 CURRENT DAY: 2 November 1981 | CALENDAR: ps:<greif>GREIF COMMAND: | | | | | | | | | | | | | | | | | | | | | |
| MONDAY 2 November 1981 Deadline for abstract | | | | | | | | | | | | | | | | | | | | | | |
| 9:00 9:30 10:00 Sunil 10:30 xx 11:00 11:30 NOON 12:30 1:00 1:30 2:00 2:30 3:00 3:30 4:00 4:30 5:00 | <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: 80%;"> <p style="text-align: center;">Choose one of the following:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">CANCEL</td> <td style="width: 33%;">?</td> <td style="width: 33%;">ARCHIVE</td> </tr> <tr> <td>CLEAR</td> <td>CHANGE</td> <td>CHECK</td> </tr> <tr> <td>HELP</td> <td>ERASE</td> <td>ESCAPE</td> </tr> <tr> <td>NOTE</td> <td>LIST</td> <td>LOOK AT</td> </tr> <tr> <td>REDISPLAY</td> <td>PRINT</td> <td>QUIT</td> </tr> <tr> <td>SHOW</td> <td>SCHEDULE</td> <td>SET</td> </tr> <tr> <td></td> <td>UNDO</td> <td></td> </tr> </table> </div> | CANCEL | ? | ARCHIVE | CLEAR | CHANGE | CHECK | HELP | ERASE | ESCAPE | NOTE | LIST | LOOK AT | REDISPLAY | PRINT | QUIT | SHOW | SCHEDULE | SET | | UNDO | |
| CANCEL | ? | ARCHIVE | | | | | | | | | | | | | | | | | | | | |
| CLEAR | CHANGE | CHECK | | | | | | | | | | | | | | | | | | | | |
| HELP | ERASE | ESCAPE | | | | | | | | | | | | | | | | | | | | |
| NOTE | LIST | LOOK AT | | | | | | | | | | | | | | | | | | | | |
| REDISPLAY | PRINT | QUIT | | | | | | | | | | | | | | | | | | | | |
| SHOW | SCHEDULE | SET | | | | | | | | | | | | | | | | | | | | |
| | UNDO | | | | | | | | | | | | | | | | | | | | | |
| *pcal> | | | | | | | | | | | | | | | | | | | | | | |

Fig. 2: The list of commands in PCAL
 obtained by typing carriage return

Figure 3

| | | | |
|--|----|--|--|
| PAST DAY:15 February 1982 CURRENT DAY:2 November 1981 | | CALENDAR: ps:<greif>GREIF COMMAND: | |
| MONDAY 2 November 1981 Deadline for abstract | | <div>Choose one of the following: CHANGE CHECK</div> | |
| 9:00 9:30 10:00 Sunil 10:30 xx 11:00 11:30 NOON 12:30 1:00 1:30 2:00 2:30 3:00 3:30 4:00 4:30 5:00 | | | |
| pca1> | ch | | |

Fig. 3: An ambiguous command is entered. The options are listed in the "help" window.

Figure 4

| | | |
|-----------------------------|------------------------------------|---------------------------|
| PAST DAY:15 November 1981 | | CALENDAR: ps:<greif>GREIF |
| CURRENT DAY:3 November 1981 | | COMMAND: |
| APPOINTMENT FORM | | |
| ----- | | |
| date: | 11-5-1981 | |
| from: | 1:30pm | |
| until: | 3:30pm | |
| keywords: | ECOLE (database) | |
| Comments: | to discuss design of pcal database | |
| participants: | sbz | |
| | sks | |
| | djc | |
| | gilbert | |
| pcal> | | |

Fig. 4: The result of a "show form" command.

Figure 5

| | | |
|--|--|---------------------------|
| PAST DAY:15 February 1982 | | CALENDAR: ps:<greif>GREIF |
| CURRENT DAY:2 November 1981 | | COMMAND: |
| MONDAY 2 November 1981 Deadline for abstract ** DAY FREE ** TUESDAY 3 November 1981 10:00 12:00 Design 13:00 14:30 course: first session 14:15 Andy Tallian WEDNESDAY 4 November 1981 Pick up rug ** DAY FREE ** THURSDAY 5 November 1981 call technical writer 13:30 15:30 ECOLE (database) 19:00 20:30 dinner FRIDAY 6 November 1981 ** DAY FREE ** | | |
| pca1> | | |

Fig. 5: The list format for the display

Figure 6

| | | | |
|---|---------------|---|-----------|
| PAST DAY: 15 February 1982 CURRENT DAY: 2 November 1981 | | CALENDAR: ps:<greif>GREIF COMMAND: APPOINTMENT | |
| TUESDAY 3 November 1981 | | | |
| 9:00 9:30 10:00 Design 10:30 xx 11:00 xx 1:30 xx NOON 12:30 1:00 course: first session 1:30 xx 2:00 Andy Tallian(at 2:15) 2:30 3:00 | | <div style="border: 1px solid black; padding: 5px;"> <p>Start Time of Appointment FORMAT: 3:00pm or 3pm REQUIRED</p> <p>For help with the editor, type '+H' To insert a ?, type '+Q?'</p> </div> | |
| Date: 11-3-1981 | Start Time: ? | End Time: | Keywords: |
| Participants: | | | |
| COMMENTS: | | | |
| pcal> appointment | | | |

Fig. 6: A question mark in a field of a form results in a short help message about the contents of that field.

Figure 7

| | | | |
|--|-------------|--|-----------|
| PAST DAY: 15 February 1982 | | CALENDAR: ps:<greif>GREIF | |
| CURRENT DAY: 2 November 1981 | | COMMAND: APPOINTMENT | |
| TUESDAY 3 November 1981 | | | |
| 9:00 9:30 10:00 Design 10:30 xx 11:00 xx 11:30 xx NOON 12:30 1:00 course: first session 1:30 xx 2:00 Andy Tallian(at 2:15) 2:30 3:00 | | | |
| | | The Start Time entry must be filled in | |
| Date: 11-3-1981 | Start Time: | End Time: | Keywords: |
| Participants: sks cimral | | | |
| COMMENTS: | | | |
| pcal> appointment | | | |

Fig. 7: An appointment form is displayed. The main display shows the appointments for the day in the "date" field.

The up arrow key was hit before a *required* field (the start time) was filled in, hence the error message.

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